DTU Systems Biology
Course 27008 Exercises for group work

Chapter 18 Recombinant DNA and Biotechnology

1. What is a clone, and what is meant by gene cloning?

2. Many restriction enzymes recognise palindromic sequences in DNA. Give an example of a DNA palindrome of 6 nucleotides

3. What is the enzyme DNA ligase used for, in the context of gene cloning?

4. Give named examples of cloning vectors and mention their most important features

5. How can PCR be used in gene cloning?

6. Explain what is meant by (i) selection (ii) screening

7. What is needed to ensure that a gene introduced via a plasmid is expressed in a host cell?

8. What is a genomic library?

9. What is cDNA?

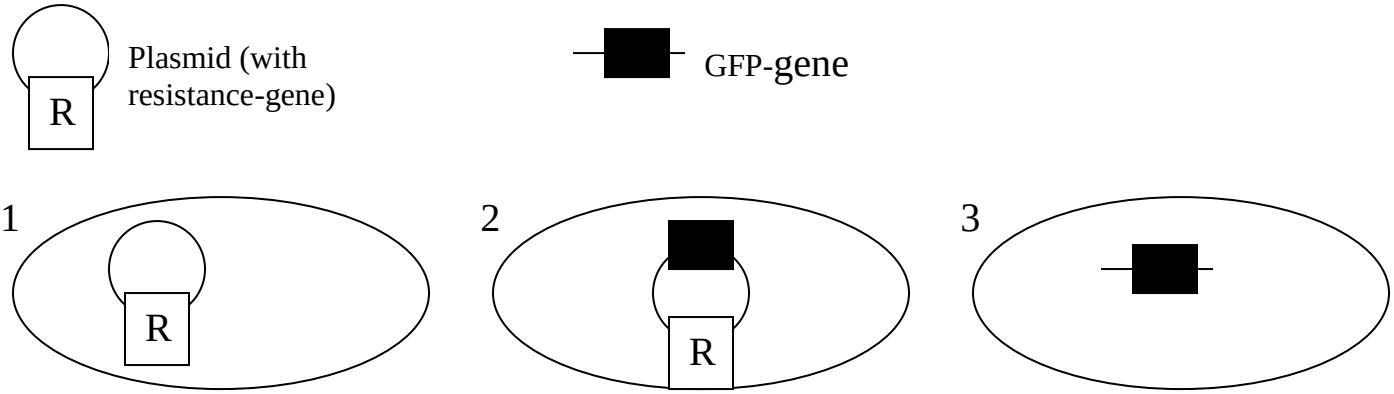
10. What is a gene-chip (DNA array) and what can it be used for?

11. How is gene technology different from traditional plant breeding methods?

12. What is your opinion about the practical applications of gene technology- what is acceptable and what should be forbidden?

13. What are transgenic animals, and in which context can they be used?

14. You carry out an experiment in which you insert a DNA fragment encoding GFP (Green fluorescent protein, a protein that fluoresces under UV light) into an expression vector (plasmid) and transfer it to bacteria. The plasmid already contains a gene that encodes an antibiotic resistance gene. Some of the bacteria will take up the DA fragment alone, others will take up the vector lacking the DNA fragment and others will take up the vector containing the inserted fragment (see below). Indicate under each figure, whether the bacterial cell in question can tolerate antibiotic and whether it has green fluorescence.



You wish to isolate bacteria belonging to each of these three groups. Describe a strategy (which screening or selection will you use?) to isolate (1) bacteria containing the plasmid without the insert (2) bacteria containing the plasmid with inserted fragment (3) bacteria not containing any plasmid